CLAIMS:

WHAT IS CLAIMED IS:

1. A method for transmitting a digital packet comprising:

encoding a plurality of N systematic bits across time into an encoded packet of size M bits;

determining a quality of at least a first channel from a feedback circuit;

dividing the encoded packet into a first transmission packet defining a first size M_1 bits that includes N_1 of the N systematic bits and a second transmission packet defining a second sizeM_2 bits that includes N_2 of the N systematic bits, wherein at least one of M1 and $N_1$is based on the determined quality of the first channel; and

transmitting in parallel the first transmission packet from a first antenna at a first rate over the first channel and the second transmission packet from a second antenna at a second rate over a second channel, wherein M, M_1, M_2, N, N_1 and N_2 are all non-zero integers except one of N_1 and N_2 may be zero, M is greater than N, M is at least equal to M_1+M_2, and N is at least equal to N_1+N_2.

2. The method of claim 1 wherein dividing the encoded packet comprises maximizing a number N_1 of systematic bits in the first transmission packet.

3. The method of claim 2 wherein $N=N_1$ and $N_2=0$.

4. The method of claim 1 wherein $M_1=M_2$ and $N_1 \neq N_2$.

5. The method of claim 1 wherein transmitting comprises:

transmitting the first transmission packet from the first antenna over the first channel at a first power modified by a first weight value, and from the second antenna over a second channel at the first power modified by a second weight value.

6. The method of claim 5 wherein transmitting further comprises:

transmitting the second transmission packet from the second antenna over the second channel at a second power modified by a third weight value, and from the first antenna over the first channel at the second power modified by a fourth weight value.

7. The method of claim 1 wherein encoding a plurality of N systematic bits across time into an encoded packet of size M bits comprises interleaving over the M bits.

8. The method of claim 7 wherein encoding further comprises turbo encoding using a single turbo interleaver of size N prior to interleaving over the M bits.

9. The method of claim 1 wherein determining a quality of at least a first channel comprises determining a capacity of said first channel.

10. The method of claim 1 wherein determining a quality of at least a first channel comprises determining a quality of a second channel, and the values of M_1 and M_2 are determined from the quality of the first and second channels.

11. A transmitter comprising:

an encoder having an input for receiving a plurality of N systematic bits and an output for outputting a plurality of M bits, wherein M is greater than N;

a channel feedback circuit for determining a channel characteristic of a first communication channel;

a demultiplexer having an input coupled to an output of the encoder and an input coupled to an output of the channel feedback circuit, said demultiplexer for outputting in parallel a first portion M_1 of the M bits at a first output and a second portion M_2 of the M bits at a second output;

a first amplifier coupled to said first output for increasing a power of said first portion M_1 of the M bits;

a first antenna coupled to the first output for transmitting said first portion M_1 of the M

bits; and

a second antenna coupled to the second output for transmitting said second portion M_2 of the M bits.

12. The transmitter of claim 11 further comprising:

a second amplifier coupled to said second output for increasing a power of said second portion M_2 of the M bits.

13. The transmitter of claim 12 further comprising:

a first eigenvector block in series with the first output, said first eigenvector block coupled to said first and said second antenna for applying a first power weight factor to said first portion M_1 of the M bits prior to transmission from said first antenna and for applying a second power weight factor to said first portion M_1 of the M bits prior to transmission from said second antenna.

14. The transmitter of claim 13 wherein said first and second power weight factor are based on at least one of a size of said first M_1 and second M_2 portion and a channel quality of a first and second channel provided by said channel feedback circuit, said first antenna transmitting over said first channel and said second antenna transmitting over said second channel.

15. The transmitter of claim 13 further comprising:

a second eigenvector block in series with the second output, said second eigenvector block coupled to said first and said second antenna for applying a third weight factor to said second portion M_2 of the M bits prior to transmission from said second antenna and for applying a fourth power weight factor to said second portion M_2 of the M bits prior to transmission from said first antenna.

16. The transmitter of claim 15 wherein said third and fourth power weight factors are based on at least one of a size of said first M_1 and second M_2 portion and a channel quality of a first and second channel provided by said channel feedback circuit, said first antenna transmitting over said first channel and said second antenna transmitting over said second channel.

17. The transmitter of claim 11 wherein said encoder comprises an interleaver of length N, the transmitter further comprising a channel interleaver of length M having an input coupled to the output of the encoder.

18. The transmitter of claim 11 wherein the first M_1 and second M_2 portion are the same size and the systematic bits are not equally distributed among the first M_1 and second M_2 portion.

19. The transmitter of claim 11 wherein said demultiplexer operates to maximize a number of systematic bits in the first portion M_1.

20. The transmitter of claim 11 further comprising a first subpacket selector having an input coupled to the first output of the demultiplexer, an input coupled to an output of the feedback circuit, and an output coupled to the first antenna, said first subpacket selector for selecting and combining, into a first transmission packet that is transmitted over the first channel, the first portion M_1 and at least one additional subpacket from the first output of the demultiplexer, wherein a size of said first transmission packet is determined at least in part based on the output of channel feedback circuit.21. The transmitter of claim 20 wherein the at least one additional subpacket comprises only parity bits.